

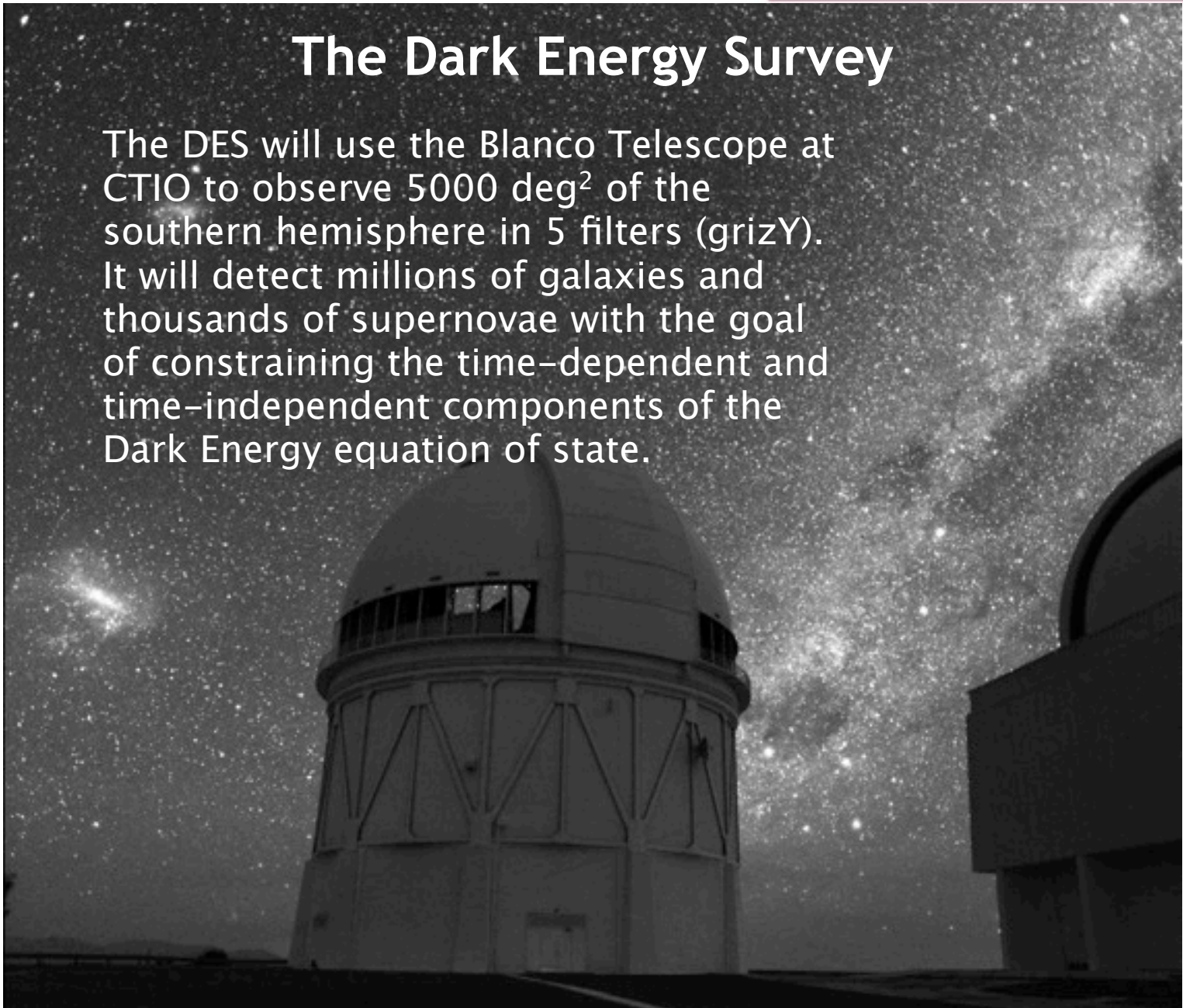
Preliminary Results from PreCam, the Precursor to the Dark Energy Camera

Kyler Kuehn
Argonne National Laboratory

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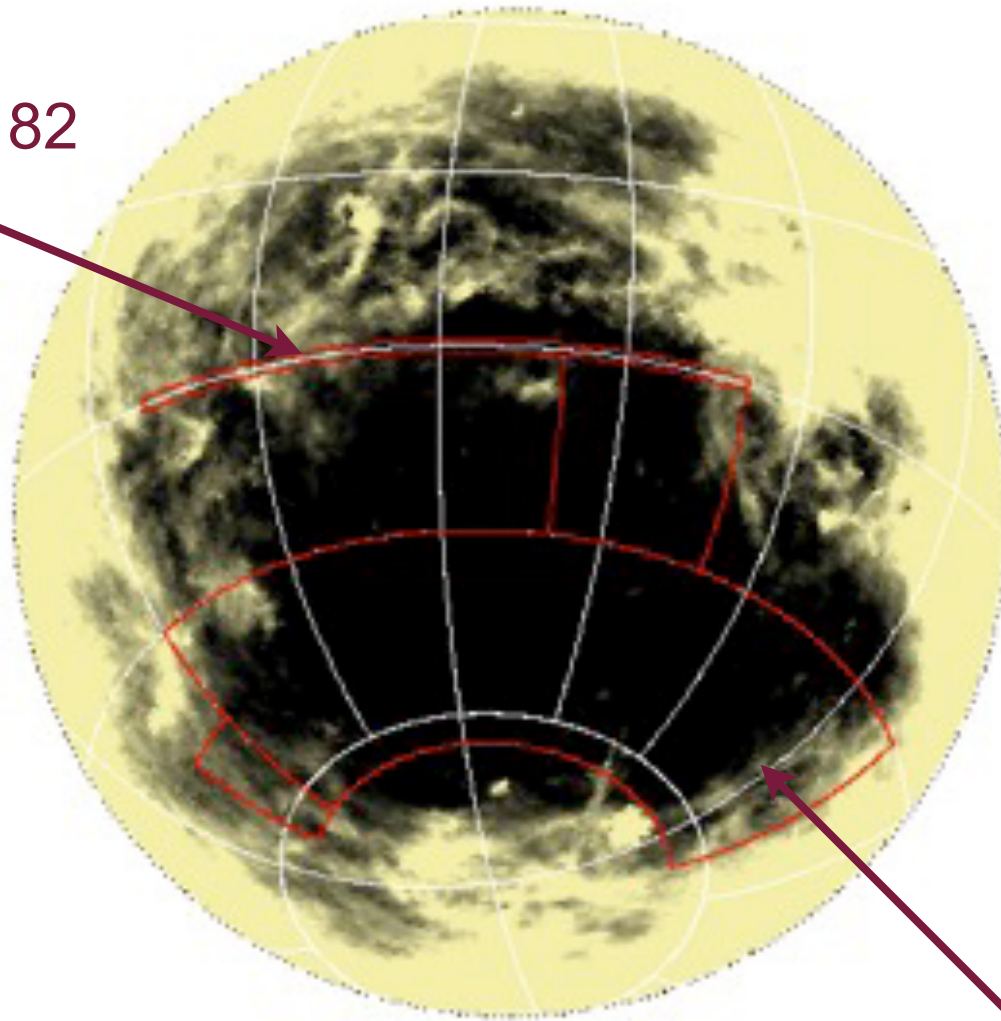
The Dark Energy Survey

The DES will use the Blanco Telescope at CTIO to observe 5000 deg² of the southern hemisphere in 5 filters (grizY). It will detect millions of galaxies and thousands of supernovae with the goal of constraining the time-dependent and time-independent components of the Dark Energy equation of state.



The DES Footprint

SDSS Stripe 82



VHS VISTA Overlap Region

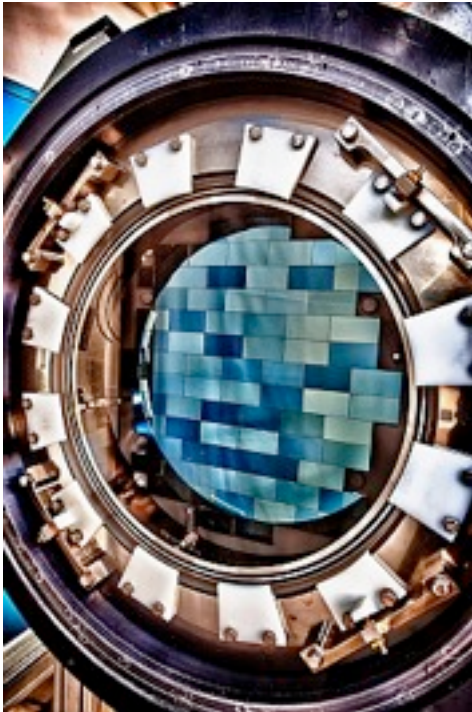


The Dark Energy Camera

DECam is a 570 Megapixel camera consisting of 62 extremely red-sensitive ($QE > 50\%$ at 1000 nm) 2k x 4k science CCDs (along with several auxiliary 2k x 2k Guide/Focus CCDs).

DECam is currently undergoing testing and installation at the Blanco Telescope prior to Dark Energy Survey observations.

During the 5 years of the DES, the DECam will also have significant time available for Community Use.



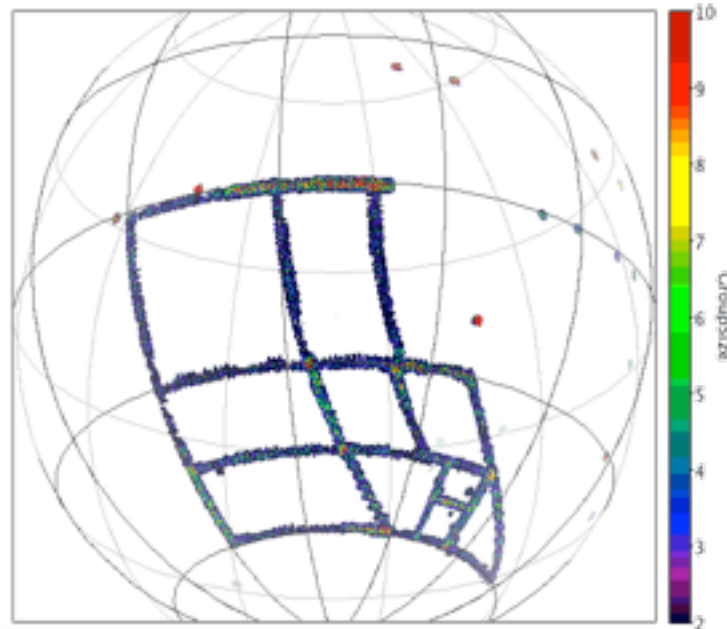
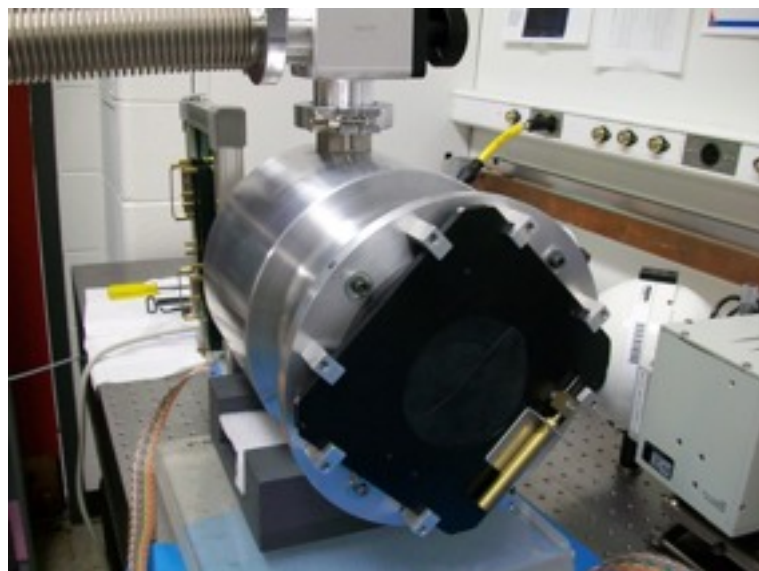
PreCam, the Precursor to the Dark Energy Camera

PreCam is a scaled down (2 CCD) version of the DECam that was used (in part) for development and testing of DECam hardware and software.

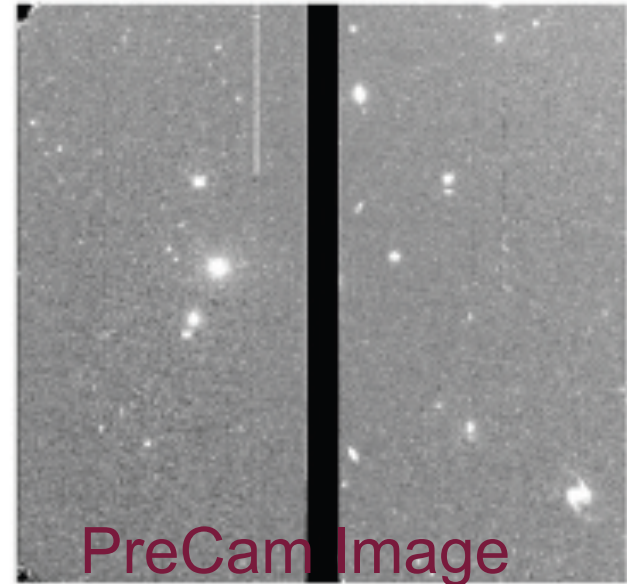
It was designed and constructed in less than one year, and it achieved first light in September 2010.

PreCam's primary goal was to observe a sparse grid of southern hemisphere standard stars for the DES (esp in Y).

Observations of standards prior to the Main Survey will save up to 10% of the DES observing time.



PreCam: Installation, Testing, and First Observations



PreCam Image



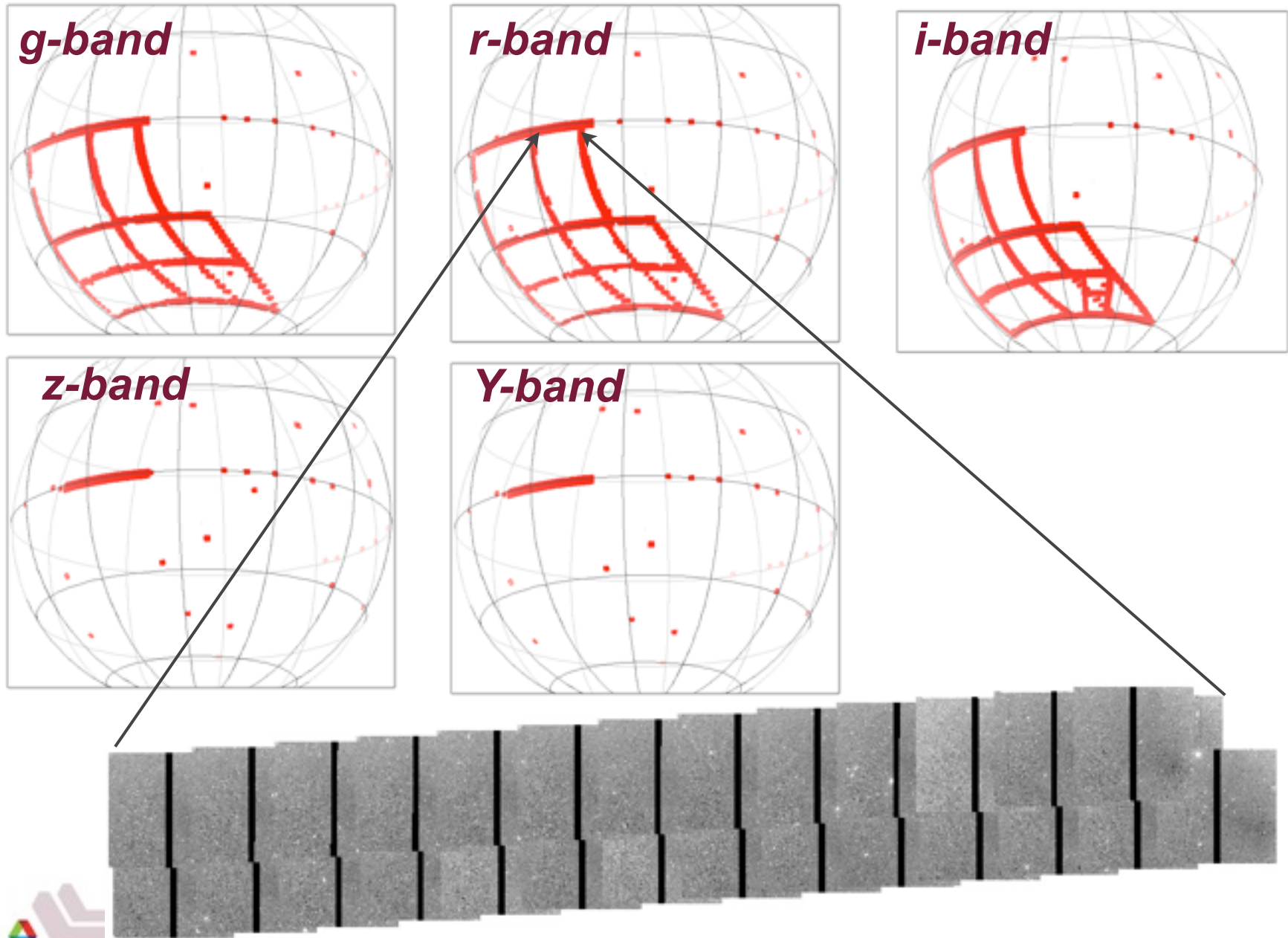
Credit: R. Ogando



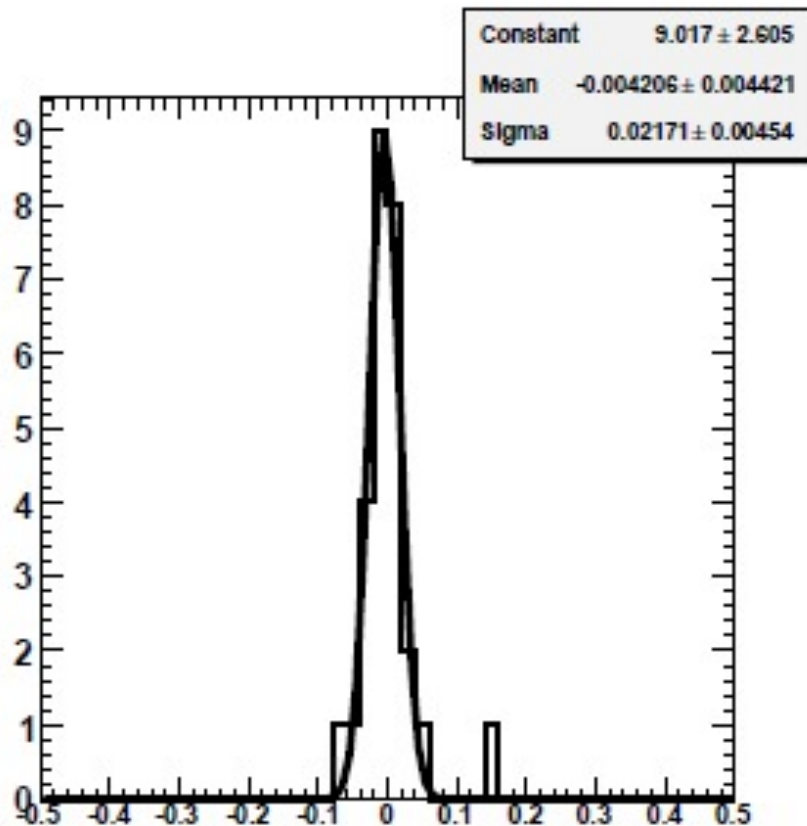
Prior Sky Survey Image



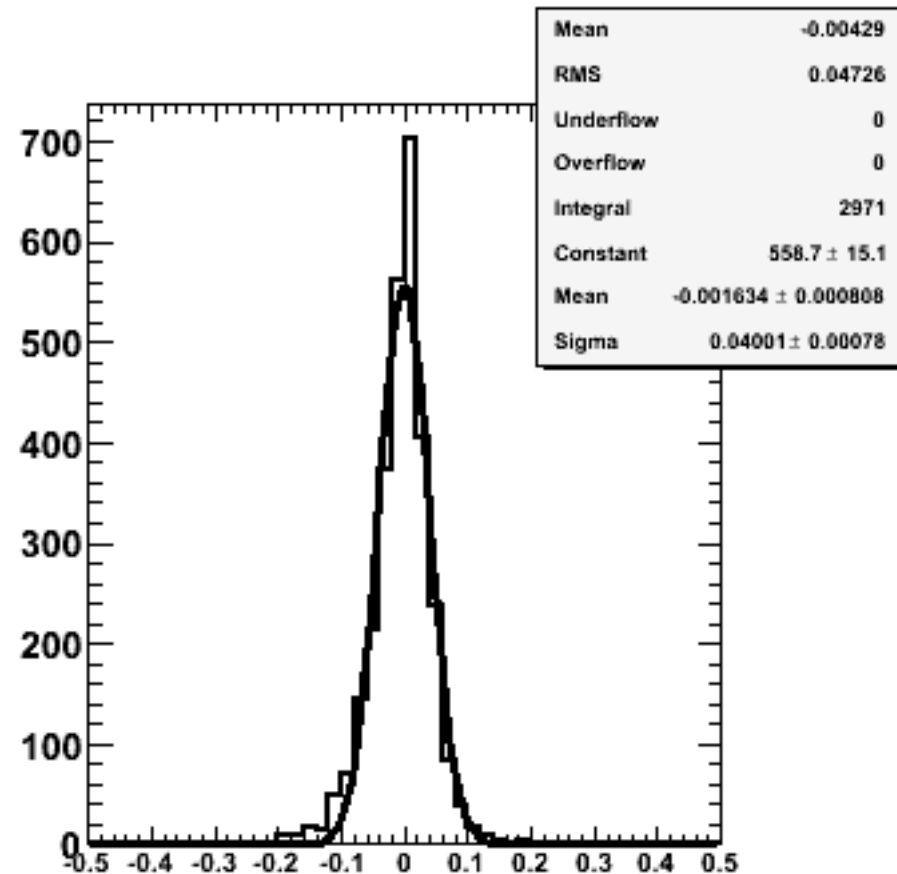
PreCam Coverage Maps



Preliminary Results I: Stellar Photometry



PreCam z - USNO z Bright

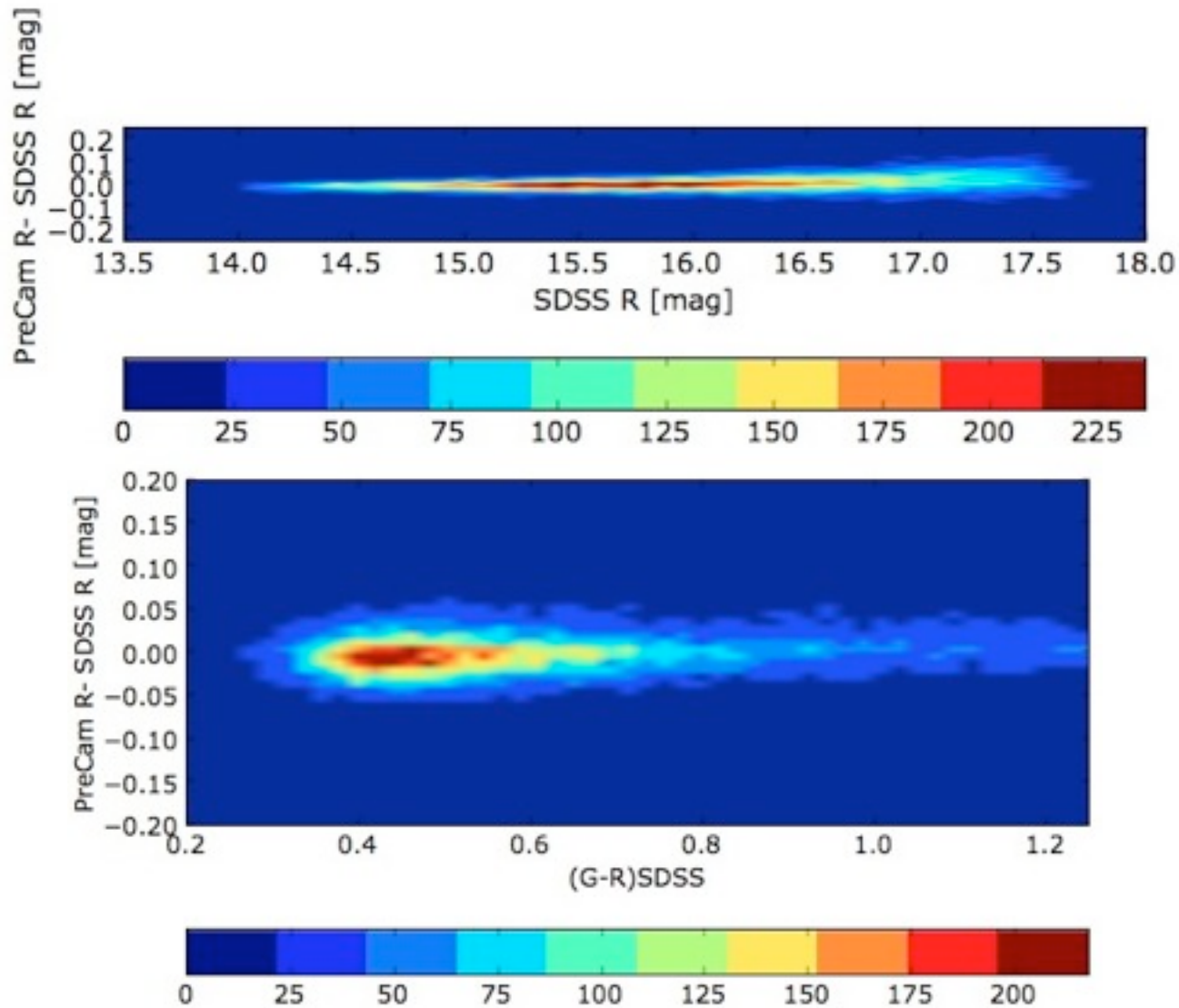


PreCam r - SDSS r

Preliminary Single-Image Photometric Accuracy:
4.0% (SDSS r,i); 3.2% (SDSS z); or 2.2% (USNO z, mag<14)



Preliminary Results II: r-band Photometric Solution



$$4.279 + 0.097 * X - .086 * (gr - 0.53)$$

Conclusions

- The Precursor to the Dark Energy Camera (PreCam) has been successfully built and deployed at Cerro Tololo Observatory
- Individual component and system-level tests have been performed on analogues to DES hardware/software
- PreCam observed a significant fraction of its total planned footprint; a second season of observations to complete the observations is being explored
- Preliminary results show single-epoch photometric accuracy of 3–4%, with accuracy better than 2% for brighter (<14 th mag) stars.
- Beyond its primary goal of identifying calibration standards, PreCam is already contributing to DES science!

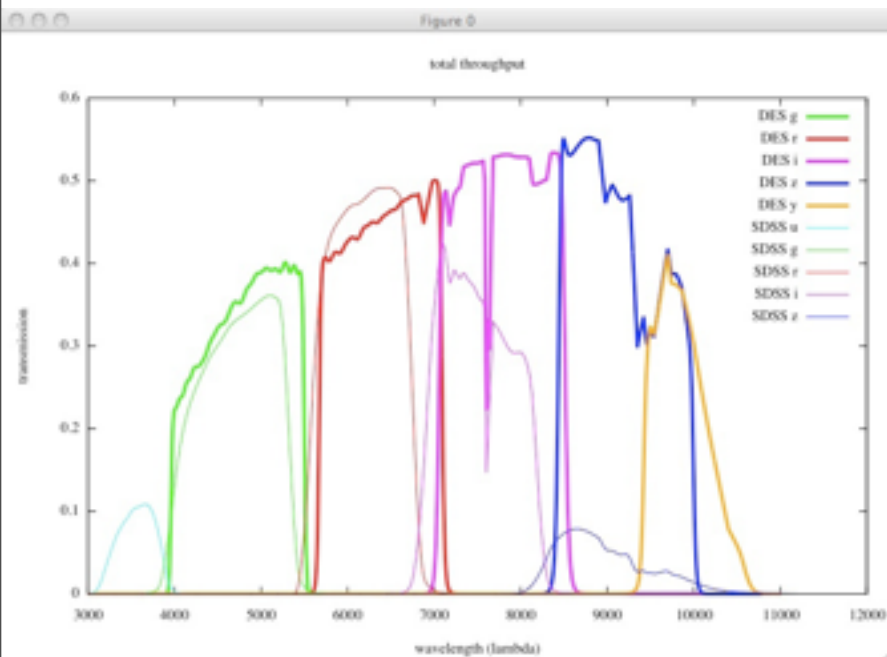


Backup Slides

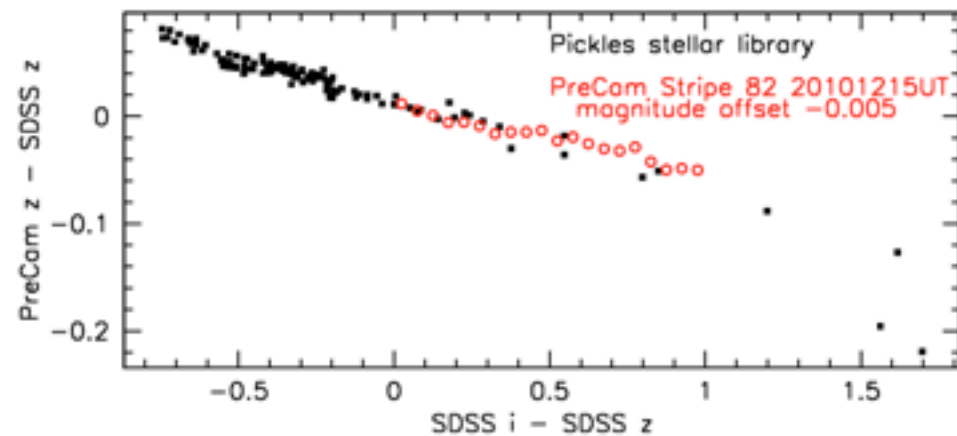
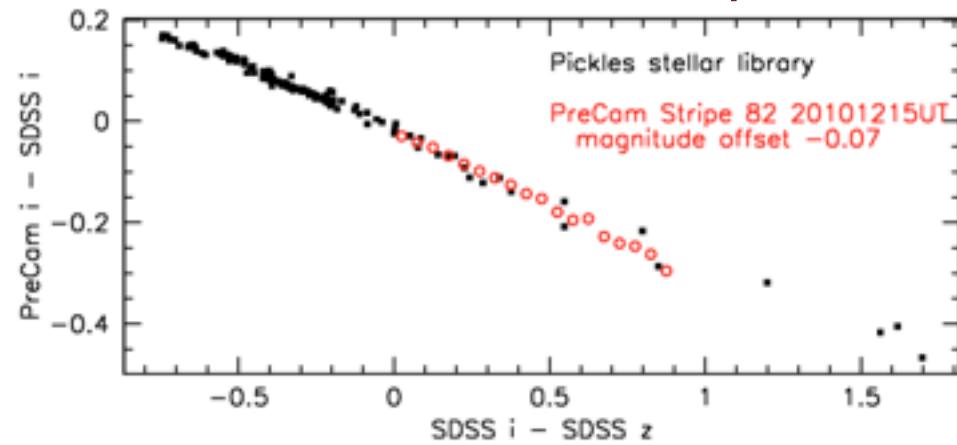


PreCam Measurements of (scaled-down) DES Filters

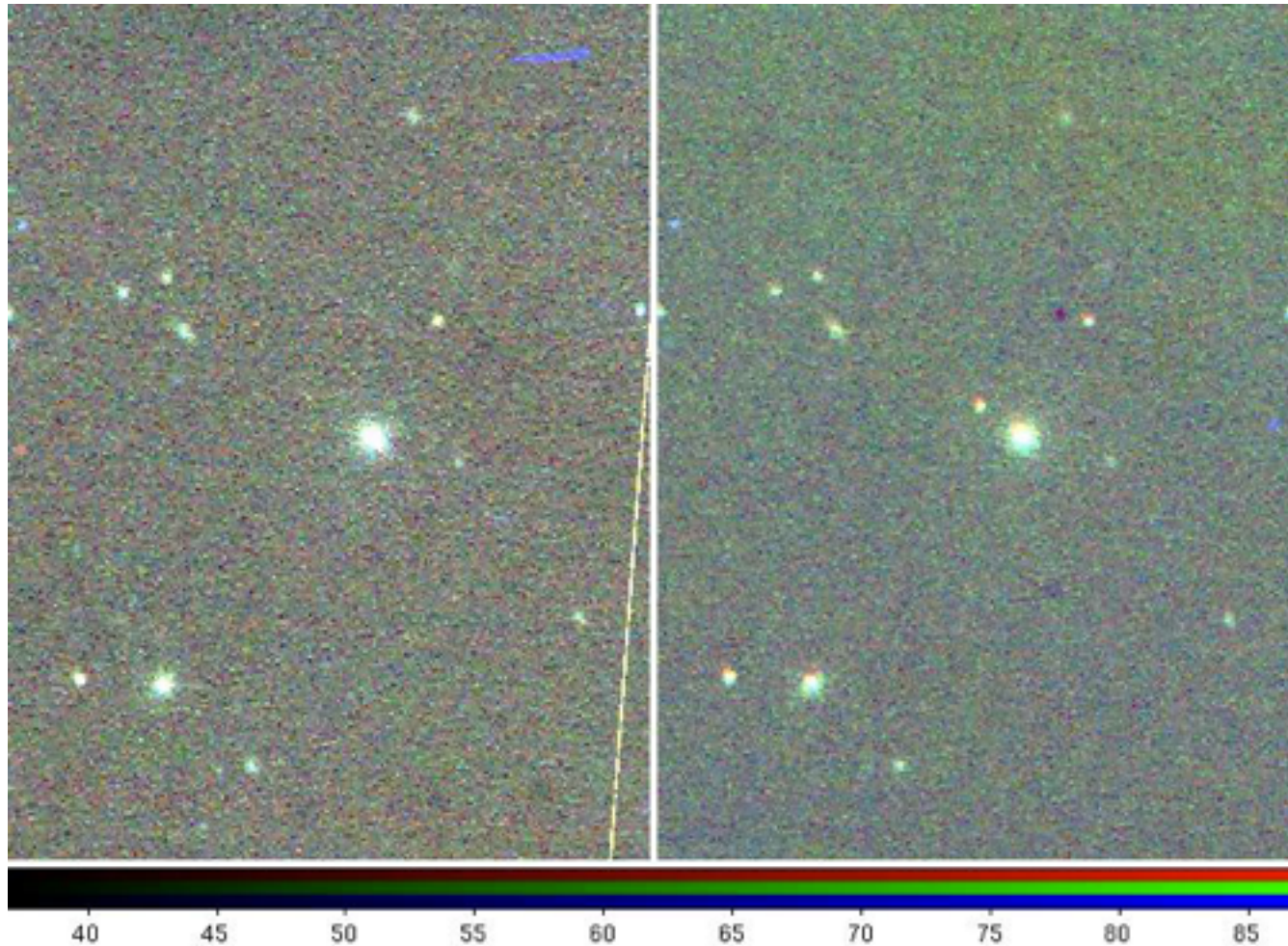
Transmission vs. Wavelength:
DES Filters vs. Sloan Filters



DES Filter Color Response



Beyond Calibrations Science: the Case of SN 2010lr



Spectroscopically Confirmed SNIa with host galaxy
2MASX J00023401-3044061 at $z \sim 0.062$
(Djorgovski et al., Prieto et al.)

SN2010lr Preliminary Lightcurve

PreCam gri Observations on 11/29/2010 to 01/07/11

